

## PSYCHOLOGICAL LITERATURE.

### TEMPERATURE SENSES.

*Untersuchungen über die Temperatursinne.* SYDNEY ALRUTZ.  
Zeitschrift für Psychol., XLVII., 161-202, 241-286; XLVIII.,  
385-396.

This investigation was undertaken in the hope of throwing more light upon the following questions: (1) Can it be determined that a heat sensation and a 'paradoxical cold' sensation, *i. e.*, a sensation produced in a cold end-organ by warm stimuli, have the same perception interval, while that of a warmth sensation is shorter? (2) At what temperature or strength of stimulus is a heat sensation first perceived on different parts of the skin? (3) Can a heat sensation be analyzed? (4) What tone has a heat sensation in general? (5) What relation does this tone bear to the cold and warmth sensations?

From the experiments which he performed, the author found that heat sensations result from a simultaneous stimulation of the cold and warmth nerves, because the perception interval of both the heat and 'paradoxical cold' sensations is twice as great as that of the warm, and lower values are obtained for the reaction time for high temperature stimuli. For these reasons he concluded that the cold nerves must have been stimulated. The reaction time of a heat sensation varies with the temperature of the stimulus and the locality of the skin affected, which is explained by the varying thickness of the skin, the difference in number of nerve cells and the susceptibility of the cold nerves to be affected by warm stimuli, since different parts of the body are accustomed to different temperatures.

From experiments on the lips and mouth, he found that pure warmth sensations, and weak ones at that, can be obtained only on two locations, (1) on the lips and (2) in the mouth, just inside the lips. On the other parts of the mouth and cheeks, it was difficult to determine whether a warmth sensation was present, before the stimulus was sufficiently increased for a heat sensation to be perceived. For different parts of the lips and the interior of the mouth, the increase of stimulus necessary to produce a heat sensation varies, and is lowest for the lower lip. On the whole, the author agrees with other writers in the view that in the interior of the mouth the warmth sense is poorly developed while the cold sense is well developed.

By varying the temperature of the skin stimulated, it was found that with a sudden lowering of the temperature of the skin, the absolute increase of stimulus necessary to produce a heat sensation is lowered, whereas the relative rise of stimulus increases considerably. With a sudden raising of the temperature, the opposite effect is obtained. In this connection, it was also observed that the ability of the cold end-organs to perceive heat sensations increases in proportion to their own rise in temperature.

Furthermore, Alrutz concludes that heat sensation cannot be analyzed, but bears the same relation to warmth and cold sensations that the color orange bears to red and yellow, *i. e.*, a heat sensation is a fusion of both warmth and cold with the cold element affecting the intensity more than the warmth. The author varied the temperature of the stimulus on a certain spot and found that heat sensations of different intensities were obtained, the weak ones having an indifferent tone, but those of greater intensity a strong and uncomfortable tone.

In order to determine the effect of these principles on bathing, some experiments were made in warm baths. In general, the results obtained were the same as above: (1) The higher the skin temperature, the higher lies the absolute increase of stimulus necessary to produce a heat sensation, and conversely. (2) The higher the skin temperature, the lower the value of the relative increase of stimulus, and conversely. (3) The heat sensations, which are produced at a temperature of 35° C. or lower, are more or less temporary and are replaced by warmth sensations, which also shortly disappear. (4) The final conclusion is that baths in water whose temperature exceeds 36° can be regarded, according to the effect produced by them on the skin, as a combination of warm and cold baths.

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#### VISION.

*The Intermittence of Minimal Visual Sensations. I. The Fluctuation of the Negative After-Image.* C. E. FERREE. Amer. Journal of Psychol., 1908, XIX., 58-129.

In a previous paper (*Am. Jour. of Psy.*, Jan., 1906) the author tried to show (1) that the intermittence of minimal visual stimuli is a phenomenon of adaptation; (2) that the intermittence is caused by involuntary eye movement; (3) that eye movement enables restoration to take place (*a*) by reducing the time of stimulation and (*b*) by shifting the area that is stimulated.